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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/072,357

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Michael D. Kilgore

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09/28/2004

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EXAMINER

GUERRERO, MARIA F

ART UNIT

PAPER NUMBER

2822

DATE MAILED: 09/28/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

**Application No.**

10/072,357

**Applicant(s)**

KILGORE, MICHAEL D.

**Examiner**

Maria Guerrero

**Art Unit**

2822

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 27 August 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-20 and 23-26 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-20 and 23-26 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)             | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

### **DETAILED ACTION**

1. This Office Action is in response to the Amendment and the Request for continued examination filed August 27, 2004

### **Status of Claims**

2. Claims 21-22 are canceled. Claims 1-20 and 23-26 are pending.

### ***Continued Examination Under 37 CFR 1.114***

3. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on August 27, 2004 has been entered.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 17 and 19-20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 17 and 19-20 recite the limitation "the idle condition plasma" in lines 1-2. There is insufficient antecedent basis for this limitation in the claims.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 8, 23, and 25-26 are rejected under 35 U.S.C. 102(b) as being anticipated by Orczyk et al. (U.S. 5,937,323).

Orczyk et al. teaches inserting a wafer into a reaction chamber, performing a plasma process on the wafer, cooling the wafer by an amount sufficient to terminate processing the wafer, and removing the wafer from the reaction chamber while maintaining the plasma (col. 3, lines 50-57, col. 13, lines 40-47, col. 14, lines 12-40, col. 16, lines 5-25). Orczyk et al. shows reducing the source RF power supplied to the plasma (col. 3, lines 64-67, col. 15, lines 3-67). Orczyk et al. discloses depositing fluorine doped silicon dioxide (Abstract).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-11, 15-17, 19-20, and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kwan et al. (U.S. 6,335,288).

6. Kwan et al. teaches inserting a wafer into a reaction chamber, performing a plasma process on the wafer, cooling the wafer by an amount sufficient to terminate processing the wafer, and removing the wafer from the reaction chamber (Fig. 1D, 3, col. 13, lines 47-67, col. 14, lines 5-10, 30-40, 50-55). Kwan et al. discloses the process temperature being greater than 400°C, the second temperature being less than 250°C or less than 150°C (col. 14, lines 23-40). In addition, Kwan et al. teaches the process being a plasma deposition of silicon dioxide for trench isolation and plasma deposition of fluorine doped silicon dioxide (Fig. 2, col. 1-10, col. 15, lines 5-25, col. 16, lines 35-36). Kwan et al. discloses a gaseous mixture is provided to the chamber and plasma is generated from this gaseous mixture to deposit some material on the substrate (col. 2, lines 57-65).

Kwan et al. does not specifically recite maintaining the plasma during removing the wafer from the reaction chamber and the specific temperature as claimed. However, Kwan et al. teaches after the second deposition is completed, the process chamber is

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purged (by flowing an inert gas into the chamber) and the deposited substrate is removed (col. 14, lines 24-54). In addition, where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation. In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to recognize that in order to the process chamber being purged the plasma is maintained because the inert gas is flowing and to specify the removal temperature by routine experimentation. The modification would provide a combination of deposition and etching process without affecting the material already in the substrate (col. 2, lines 60-67).

7. Claims 14 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kwan et al. (U.S. 6,335,288) in view of Chang et al. (U.S. 6,143,579) (cited by Applicant).

Regarding claims 14 and 18, Kwan et al. does not specifically show etching a photoresist and the wafer having a gate dielectric layer. However, Chang et al. teaches etching a photoresist and the wafer having a gate dielectric layer (col. 5, lines 28-30, 50-55).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Kwan et al. reference by including the steps of etching the photoresist and forming the gate dielectric layer as taught Chang et al. because

Kwan et al. suggested that other variations are included within the scope of this invention (Kwan et al., col. 15, lines 13-27).

8. Claims 12-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kwan et al. (U.S. 6,335,288) in view of Wang et al. (U.S. 6,268,274).

Regarding claims 12-13, Kwan et al. does not specifically show depositing a phosphorous-doped silicon dioxide layer. However, Wang et al. shows a plasma process to deposit a phosphorous-doped silicon dioxide layer (col. 6, lines 30-40).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Kwan et al. reference by including phosphorous-doped silicon dioxide layer as taught Wang et al. because Kwan et al. suggested that different precursors can be used to form films of different composition (Kwan et al., col. 15, lines 15-25).

### ***Response to Arguments***

9. Applicant's arguments with respect to claims 1-20 and 23-26 have been considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Ishikawa et al. (U.S. 6,660,662) teaches the steps of inserting, processing, cooling and removing as conventional in the art.


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11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Maria Guerrero whose telephone number is 571-272-1837.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on 571-272-1852. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

September 21, 2004

  
**MARIA F. GUERRERO**  
**PRIMARY EXAMINER**